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Paper Abstract

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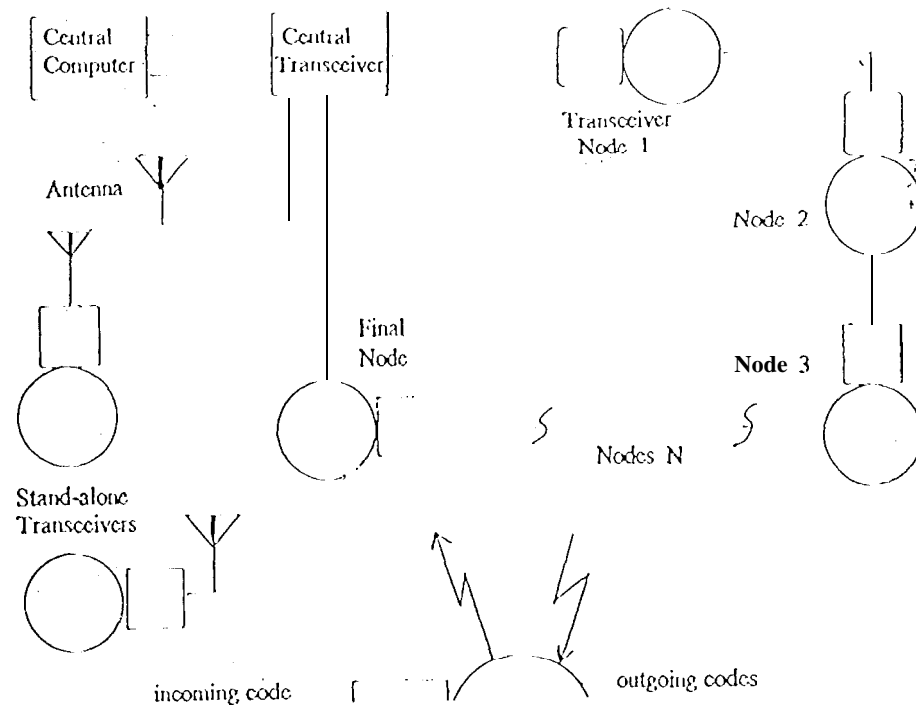
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Description (use additional sheet if necessary):

C. TECHNICAL CONCEPT

The concept of the Person Locator System (PLS) is to integrate a low power, medium frequency node-transceiver/transponder system with a computer hardware/software system which graphically depicts, in two or three-dimensional (2-D/3-D) form, any designs or layouts of a given (inputted) custody facility. The PLS finds the location and tracks the movements, in real-time, of any person within the confines of the perimeter of a facility or within any building of the facility who is wearing a transponder wrist-band (not discernible from the commonplace hospital wrist-band currently used for such purposes).

The node-transceiver system may be a series of inexpensive "hardwired" (incoax cable) mini-devices, which would be unobtrusively mounted in walls or ceilings; or a series of stand-alone transceivers, mounted on walls, poles, or even embedded in walls. Either node-transceiver system may be used for interior or perimeter query by a computer controlled, Central Transceiver Unit (CTU) which is modulated (with the digital code of one or many individual wrist-bands) by the computer software system. Figure 1 below is a block diagram of a simple system which depicts both hardwired and stand-alone nodes.



WRISTBAND TRANSPONDER

The intended design of the hardwired node-transceivers will allow these devices to be embedded mechanically and connected electrically in a typical coax cable of no more than 3/8 in. diameter. The node-transceivers will be protected environmentally by shrink-fit tubing. In bus, the nodes will be, upon final assembly, essentially indiscernible from the coax cable, thus allowing the system to be "disguised" as much as practicable. The nodes will be installed in the cable at distances which are to be determined as optimal for complete area coverage for the facility in which the system is installed. JPL's extensive experience with the Deep Space Network (DSN) Antenna Testing Range facilities, will provide the proper test-bed for optimizing the node area coverage. The hardwired node-transceiver system will depend upon the central transceiver output to the coax cable for power. The wristband is powered by the radiated radio frequency (RF) of the node transceivers and will transpond (reflect back) a signal corresponding to the digital code embedded in the wristband, to the closest node-transceiver. The stand-alone transceiver nodes must be powered separately and will receive a RF, digitally modulated signal, transmitted by the Central Transceiver through an external antenna. Each node-transceiver (whether hardwired or stand-alone) has a unique digital code, associated with its specific location. In the simplest, hardwired example, when a prisoner's unique code is transmitted through the coax system, it gets "broadcast" by each node, in sequential order along the system. When the case is such that this unique code is received by the corresponding wristband, which the code matches, it "excites" that wristband to "re-broadcast" the code back to the nearest transceiver node, using the radiated power of the node-transceivers alone. It is thence, carried along the system until the loop is completed, back at the Central Transceiver. There it is processed so as to be usable by the Central Computer and is integrated with the Graphics and Data Base Modules for display to an operator, showing the exact location of the wristband. The wristband is "tamperproof", having an embedded wire loop which, when broken or torn off and discarded, will respond to any signal along the system. If a wristband has been "shielded" with aluminum foil or otherwise rendered inoperable, and its unique digital code is transmitted in the system, the software will alarm/alert the central computer operator that it is "missing" in the system. Similarly, every wristband will contain a "uniform code" which will automatically respond to the facility perimeter transceiver nodes. The perimeter system transmits this uniform code all the time. Thus, if a prisoner violates the perimeter, a warning alert is sounded at the operator's computer console and interdiction can be swift.